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E74-10492) WATER SURVEY OF CANADA:  
APPLICATION FOR USE OF ERTS-A FOR  
RETRANSMISSION OF WATER RESOURCES DATA  
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14. Supplementary Notes  Report prepared by I.A. Reid		
15. Abstract  Nine platforms have been installed. Eight platforms are operating normally. One platform is not operating due to a severe failure in the programmer board. Data are available from the Canada Centre for Remote Sensing by Telex and Teletype on a near real time basis.		

Water Survey of Canada  
Application for Use of ERTS-A for  
Retransmission of Water Resources Data

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1. Accomplishments

a) In co-operation with the Atmospheric Environment Service (AES), Department of the Environment, a Hydrometeorological Automatic Recording and Telemetering System (HARTS) was put into operation on October 23, 1973 at the site of DCP 6102 (Albany River above Nottick Island). The system encodes and stores data from a Fisher-Porter precipitation gauge and a platinum resistance bulb thermometer. The water level reading from the Leupold and Stevens water level encoder is also stored by the system. Accumulated precipitation to the nearest 0.030 m (0.1 ft.) and temperature to the nearest 0.0555C<sup>0</sup> (0.1F<sup>0</sup>) and water level (four digits) are encoded for transmittal by ERTS. The HARTS system developed by AES has also been used for encoding of snow pillow and wind run anemometer data for transmittal by the AES DCP 6330.

b) During this reporting period, users across Canada were able to receive near real time ERTS data from the 14 Canadian DCPs by using Telex. Previously these data were available only by Teletype.

At present, the ERTS data are periodically inputted to the Canada Centre for Remote Sensing (CCRS) time sharing computer system. A software data retrieval system sorts the user platforms, reformats the data into engineering units and stores individual user files on disk. The user may then access his data file using either a Teletype or Telex remote terminal.

2. Major Problems

a) Platform 6260 was moved from Mackenzie River near Wrigley to the Rideau River at Ottawa in order to conduct sensor tests. On installation in Ottawa, the platform did not operate. When the box was opened, the programmer board was well fried and the analogue board

was damaged to a lesser extent. Polarity of the DCP power supply may have been reversed during installation in Ottawa. The battery ground is not common with sensor ground. The boards were repaired then the DCP was again installed at the Rideau River at Ottawa site. The fuse blew. A fuse connection was made with copper wire. The DCP worked well for say 10 minutes when suddenly one of the integrated circuits failed. Further repairs are now being made.

b) The antenna ground plane for DCP 6126, Duncan River below B.B. Creek, became badly bent due to snow loading. Despite this, valid readings were still received in roughly the same numbers as before the snow loading took place.

Transmissions from DCP 6232, Nahatlatch River below Tachewana Creek, ceased for a few days but started again without anyone visiting the site. This interruption is thought to have been caused by a loading of wet snow on the antenna ground plane. When the site was visited after normal transmissions had resumed, there was no snow on the ground plane.

c) Some difficulties have been encountered with the GE timer used in the Memomark II water level encoder. This timer seems to stop operating in cold ( $< -30^{\circ}\text{C}$ ) temperatures. Two other timers have been investigated and probably one of these will be installed in each encoder in 1974.

As an interim measure, the battery supply for some of the GE timers has been paralleled to see if this increased capacity will help.

### 3. Significant Results

Since the first of the nine DCPs installed began transmitting water level data on August 2, 1972 only DCP 6260 has experienced a failure. During this period an estimated 50,000 messages have been received from the nine platforms.

Many of these messages are obtained daily by Telex in District Offices located in Winnipeg, Calgary and Vancouver. The data telexed to Vancouver are also used by the British Columbia Hydro and Power Authority and the British Columbia Water Resources Service on a daily operational basis for the Columbia River Treaty data exchange program and for flow forecasting on the Fraser River.

4. Significant Changes in Operating Procedures

a) ERTS data can now be received daily at remote Telex terminals. Remote terminals are located in all major Canadian cities.

At present the Telex messages are updated daily. In an emergency situation, the messages can be updated more frequently. CCRS is planning to provide automatic updating after each orbit in 1974.

5. Published Articles or Papers

a) R.A. Halliday, I.A. Reid, and E.F. Chapman, Retransmission of Water Resources Data Using the ERTS-1 Data Collection System, presented at the ERTS Principal Investigator's Symposium, December 10-14, 1973, Washington, D.C., in accordance with section four of the Provisions for Participation.

6. Recommendations

The Data Collection System carried by ERTS-1 and the ground data handling operation should be maintained until complete failure of the spacecraft.

Future Plans

The ERTS-B Technical Proposal dated January 15, 1973, described the Water Survey of Canada's proposed use of 14 Data Collection Platforms to obtain water level and associated data. The revised Technical Proposal dated November 28, 1973 develops the quasi-operational aspects of the original proposal dated January 15, 1973 and indicates a further expansion of the DCP network.

A network of approximately 30 Data Collection Platforms in widely dispersed remote areas of Canada is proposed. Data users in several Canadian Cities will be provided with near real time data for water management purposes. The costs of the system will be compared with those of land line telemetry systems and the benefits of obtaining real time data from the remote sites will be assessed.

The water level and streamflow information is used by Federal and Provincial Agencies, Hydro-electric Companies and Engineering Firms for design of dams, irrigation systems, drainage systems and bridges, for flow and flood forecasting, for project regulation and for pollution control.

To implement the ideas in the revised proposal, an order for 19 ERTS-GOES convertible platforms has been placed with Ball Brothers Research of Boulder, Colorado. It is hoped that these platforms will be used with ERTS-1 as well as ERTS-B.